



**General Certificate of Secondary Education  
November 2010**

**Mathematics**

**43051H**

**Higher**

**Module 1**

**Final**

***Mark Scheme***

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

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**The following abbreviations are used on the mark scheme:**

<b>M</b>	Method marks awarded for a correct method.
<b>M dep</b>	A method mark which is dependent on a previous method mark being awarded.
<b>A</b>	Accuracy marks awarded when following on from a correct method. It is not necessary always to see the method. This can be implied.
<b>B</b>	Marks awarded independent of method.
<b>ft</b>	Follow through marks. Marks awarded for correct working following a mistake in an earlier step.
<b>SC</b>	Special Case. Marks awarded for a common misinterpretation which has some mathematical worth.
<b>oe</b>	Or equivalent.

**MODULE 1 HIGHER TIER**

**43051H**

1a	4	B1	
1b	19	B1	
1c	0 2 0 1 1 1 1 2 0 1 1 0	B2	Allow tallies, crosses, marks, ticks or integers, 0s may be blank  Allow B1 for 8 - 11 entries correct Mark their best solution offered SC1 for all names entered correctly
1d	7	B1	

2a	$0.30 + 0.10 (= 0.40)$	M1	$2000 \times 0.3 (= 600)$ or $2000 \times 0.1 (= 200)$ or $2000 \times$ any other probability in table eg $2000 \times 0.17 (= 340)$
	their $0.40 \times 2000$	M1	their 600 (+) their 200 or their 600 or their 200 (+) MR expectation (eg $600 (+) 2000 \times 0.17$ )
	800	A1	$\frac{800}{2000}$ A0 800 out of 2000 M2 A1
	<b>Alternative method</b>		
	$(0.18 + 0.17 + 0.25) \times 2000$	M1	
	$2000 -$ their 1200	M1	
	800	A1	
2bi	Correct midpoints seen and used 35, 45, 55	M1	One or more midpoints used in some way
	$\sum fx$ ( $35 \times 400 + 45 \times 1460 + 55 \times 140$ ) or their $14000 + 65700 + 7700 (= 87400)$	M1	Value in or on class boundaries apply correct inequality signs
	$\frac{\sum fx}{\sum f} = \frac{\text{their } 87400}{2000}$	M1 dep	dep on 2nd M1
	43.7	A1	43.7 seen with further incorrect working $\Rightarrow$ penalise 1 44 from correct working seen $\Rightarrow$ 4 marks
2bii	Used grouped data (rather than actual data) or used midpoints (rather than actual data) or don't know raw data values	B1	oe eg reference to classes etc
2ci	$39 \pm 1$	B1	
2cii	[1650, 1750] seen	M1	
	[250, 350]	A1	

3a	$\frac{1}{5} \frac{4}{5} \frac{4}{5}$ oe	B1	Round 2 probabilities correct
	$\frac{1}{10} \frac{9}{10} \frac{11}{15} \frac{4}{15} \frac{4}{10} \frac{6}{10} \frac{14}{15} \frac{1}{15}$ oe	B2 ft	Round 3 all probabilities correct or ft B1 at least 2 pairs correct or ft ( $\sum$ pairs = 1) eg $\frac{11}{15} \frac{4}{15} \frac{4}{10} \frac{6}{10}$ $\frac{0.5}{5}$ penalise 1 in whole question
3b	their $\left(\frac{2}{5} \times \frac{4}{5} \times \frac{4}{15}\right)$ or their $\left(\frac{3}{5} \times \frac{4}{5} \times \frac{3}{5}\right)$ or their $\left(\frac{3}{5} \times \frac{1}{5} \times \frac{14}{15}\right)$ or WLL or LWL or LLW	M1	Recognising the correct pathway or their triple product or marked a correct pathway on tree diagram
	WLL + LWL + LLW	M1 dep	Adding their 3 triple products or 3 pathways
	their $\left(\frac{2}{5} \times \frac{4}{5} \times \frac{4}{15}\right) +$ their $\left(\frac{3}{5} \times \frac{4}{5} \times \frac{3}{5}\right)$ + their $\left(\frac{3}{5} \times \frac{1}{5} \times \frac{14}{15}\right)$	A1 ft	(must be probabilities) (can allow $\frac{0.5}{5}$ now)
	$\frac{182}{375}$ or 0.485(...) or 0.49 or better	A1	

4	Fully correct eg 3, 6, 6, 6, 9	B3	B2 for 3 conditions satisfied eg 26668 B1 for 2 conditions satisfied eg 26669 Accept 0's, do not accept blank cards
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5a	All 8 points plotted correctly $\pm \frac{1}{2}$ sq	B2	B1 for 6 or 7 points correct
5b	Strong positive	B2	B1 each word correct, allow fairly strong No contradictions
5c	F	B1	

6a	She is only selecting customers that buy the supermarket's own brand	B1	
6b	Using any appropriate/valid method of her choosing an unbiased sample	B1	eg ask the first 100 customers that enter the store or do a taste testing in store or select 50 own and 50 other etc

7ai	Top box plot labelled Toddlers or second box plot labelled Teenagers	B1	Other box plot may not be labelled but must not be labelled the same
7aii	Interquartile range 2	B1	
	Range 6 and Median [9.4, 9.6]	B1	
	Interquartile range [1.4, 1.6]	B1	
7b	Toddlers sleep (on average) less than teenagers ( $9 < 9.5$ ) or v v	B1	or there is not much difference between the averages (medians)
	or the toddlers sleep patterns are less spread out than the teenagers or the toddlers sleep patterns are more consistent	B1	<b>Must be an interpretation</b> (not just comparing numbers) Assume they are referring to range if not mentioned
	or the interquartile range suggests that toddlers sleep patterns are less consistent (must be clear they are referring to interquartile range here)		

8a	$\frac{45}{15} (= 3.0)$ or $\frac{40}{50} (= 0.8)$	M1	Can be implied from correct height of one bar with correct width
	Fully correct $\pm \frac{1}{2}$ sq	A1	
8bi	$\frac{1}{5} \times 40\ 000$	M1	
	8000	A1	
8bii	Assume data is evenly spread	B1	Note: Densities
8biii	$\frac{40000 - 10000}{2} \left( = \frac{30000}{2} \right)$	M1	
	15 000	A1	